CLAIMS

1. A converter system comprising:

an AC-to-DC first converter stage connectable to an input AC supply and operative to produce a DC output on a DC link; and

a DC-to-AC second converter stage directly connected to the DC link and producing an AC output for driving an AC load at a frequency and amplitude;

wherein the first converter stage comprises a bridge of bi-directional electronic switching elements connected between the input AC supply and the DC link and control means for activating the electronic switching elements of the bridge with variable phase relative to the input AC supply in order to vary the DC output on the DC link to the second converter stage.

2. The converter system of claim 1, wherein the DC-to-AC second converter produces the AC output for driving the AC load at the frequency and amplitude which is equal to a frequency and amplitude of the input AC supply.

3. The converter system of claim 1, wherein the electronic switching elements are controlled so that the polarity of DC output on the DC link is never reversed.

4. The converter system of claim 1, further comprising:

a motor commutator stage wherein the electronic switching elements of the commutator stage are controlled in such a manner that the period corresponding to an integer number of commutation cycles n, is arranged to be equal to the period corresponding to an integer number of switching sequences m, of the converter system, thereby eliminating low frequency beating components in the response of the load.

5. A paired-converter system comprising:

A first converter system and a second converter system forming a paired-converter system where each of the converter systems comprises:

an AC-to-DC first converter stage connectable to an input AC supply and operative to produce a DC output on a DC link; and

a DC-to-AC second converter stage directly connected to the DC link and producing an AC output for driving an AC load at a frequency and amplitude;

wherein the first converter stage comprises a bridge of bi-directional electronic switching elements connected between the input AC supply and the DC link and control means for activating the electronic switching elements of the bridge with variable phase relative to the input AC supply in order to vary the DC output on the DC link to the second converter stage.

wherein each of the converter systems are fed from a common input AC supply and arranged to drive a system of independent and substantially balanced loads,

wherein the electronic switching elements of the converters are controlled in so that the switching sequences relative to the supply are advanced in phase in one converter system and retarded by a similar amount in the other converter system, thereby achieving a close to unity power factor for the overall load presented to the input AC supply.

6. The paired-converter systems of claim 5, wherein the DC-to-AC second converter produces the AC output for driving the AC load at the frequency and amplitude which is equal to a frequency and amplitude of the input AC supply.

7. The paired-converter systems of claim 5, wherein the electronic switching elements are controlled so that the polarity of DC output on the DC link is never reversed.

8. The paired-converter systems of claim 5, further comprising:

a motor commutator stage wherein the electronic switching elements of the commutator stage are controlled in such a manner that the period corresponding to an integer number of commutation cycles n, is arranged to be equal to the period corresponding to an integer number of switching sequences m, of the converter system, thereby eliminating low frequency beating components in the response of the load.

9. A variable speed motor drive system comprising:

an AC-to-DC first converter stage connectable to an input AC supply and operative to produce a DC output on a DC link;

a DC-to-AC second converter stage directly connected to the DC link and producing an AC output for driving an AC load at a frequency and amplitude; and

a multiphase DC motor coupled to a DC-to-AC second converter stage;

wherein the first converter stage comprises a bridge of bi-directional electronic switching elements connected between the input AC supply and the DC link and control means for activating the electronic switching elements of the bridge with variable phase relative to the input AC supply in order to vary the DC output on the DC link to the second converter stage.

10. The variable speed motor drive system of claim 9, wherein the DC-to-AC second converter produces the AC output for driving the AC load at the frequency and amplitude which is equal to a frequency and amplitude of the input AC supply.

11. The variable speed motor drive system of claim 9, wherein the electronic switching elements are controlled so that the polarity of DC output on the DC link is never reversed.

12. The variable speed motor drive system of claim 9, further comprising:

a motor commutator stage wherein the electronic switching elements of the commutator stage are controlled in such a manner that the period corresponding to an integer number of commutation cycles n, is arranged to be equal to the period corresponding to an integer number of switching sequences m, of the converter system, thereby eliminating low frequency beating components in the response of the load.